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AMBIENT AIR QUALITY SURVEY:

CANADIAN GYPSUM COMPANY  
WESTON, ONTARIO

OCTOBER 1990



Environment  
Environnement



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AMBIENT AIR QUALITY SURVEY:  
CANADIAN GYPSUM COMPANY, WESTON, ONTARIO

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OCTOBER 1990



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### Executive Summary

A mobile air monitoring unit from the Air Resources Branch conducted an air quality survey in the vicinity of the Canadian Gypsum Company (CGC) plant in northwest Toronto during the period July 24 to August 4, 1989. Survey objectives were to measure the ambient concentration of total reduced sulphur compounds (rotten egg odour) and various organic and chlorinated organic compounds.

The monitoring crew noticed only one brief odour episode for total reduced sulphur, when a 1-minute average of 37 ppb was reached but the maximum 1/2-hr average concentration was low (7 ppb).

Organic compounds were not found in significant concentrations during any of the monitoring periods. Phenolic resin odours were noticed only during a pre-screening sample period but could not be measured by the analytical system in use.

## 1.0 Introduction

As requested by the Central Region a mobile air monitoring unit (MAMU #1) from the Air Resources Branch conducted an ambient air quality survey in the vicinity of the Canadian Gypsum Company (CGC) plant in northwest Toronto during the period July 24 to August 4, 1989. The survey objectives were to determine the ambient concentration of total reduced sulphur (TRS) compounds (mainly hydrogen sulphide -  $H_2S$  - which causes rotten egg odour), and to analyze ambient air samples on the gas chromatograph (gc) for the presence of organic and chlorinated organic compounds.

## 2.0 Source Description

The CGC plant is a manufacturer of rock wool insulation, as both loose rock wool and bat insulation. The bat insulation has phenolic resins added to bind the rock wool together. The company has installed control equipment to reduce odours and contain particulate, but continues to be the object of complaints about odour and rock wool emissions into the adjacent residential area.

The CGC plant is located on Oak Street, near Weston Road about one kilometre south of highway 401. There is a great deal of heavy truck traffic in the area due to the proximity of the major highways, a Knob Hill Farms terminal on the north side of Oak Street, and many other industries in the area.

## 3.0 Results

The weather during the survey period featured hot days with low wind speeds, interspersed with several days of thunderstorm activity. There were very few suitable monitoring periods (with steady wind speeds more than one metre per second and steady wind direction) when the CGC plant emissions, and only that plant's emissions, could be sampled with some degree of confidence.

Only six days of the two week period were suitable for monitoring. Twelve separate periods produced 11 downwind 1/2-hr samples for the gas chromatograph and 2 upwind 1/2-hr samples for comparison. The monitoring locations and periods are shown on Figure 1 and listed in Table 1.

### 3.1 Organic compounds

The gas chromatographic analyses were dominated by the usual



list of compounds present in areas of heavy vehicular traffic: butane, pentane, benzene, toluene and xylenes (m-, p-, and o-).

A few chlorinated organic compounds were found, but at concentrations found in most downtown Toronto samples ( a few micrograms per cubic metre of ambient air). None of the target compounds listed in Table 2 were found in concentrations exceeding or approaching any of their established provincial standards (where they exist). Also, both upwind samples (one acquired east of the CGC plant in a residential area, the other acquired west of the plant near Weston Road) showed concentrations generally higher than any of the downwind samples. This supports the view that the CGC plant was not a significant source of the target compounds listed in Table 2.

Some pre-screening air samples were collected by portable samplers during a period of mild resin-like odours two weeks before the survey started. Analysis did not detect any compounds that could have caused the odour.

Several samples were also collected by portable sampler during the survey period and analyzed at the Air Resources Branch. Those results are shown in Table 3.

### 3.2 Total reduced sulphur (mainly hydrogen sulphide- $H_2S$ )

The sulphur analyzer used in this survey detects all reduced sulphur compounds (including  $H_2S$ ) equally well, but can not distinguish between them. The most probable reduced sulphur compound in this case is  $H_2S$ , but without confirmatory identification by another technique the results must be reported as total reduced sulphur (TRS).

The concentration of TRS was always low ( < 5ppb) except for a brief period on July 25 around 11:15 a.m., when the distinct odour of rotten eggs was present along Holley Street adjacent to the southwest side of the CGC plant. The maximum concentration of TRS was 37 ppb (parts per billion) for a 1-minute average, which is large enough to cause the odour level observed by the monitoring crew of MAMU #1, but the maximum 1/2-hr average was only 7 ppb. There is no Ministry standard or criterion in Ontario for ambient air TRS except for kraft pulp mills (27 ppb - 1/2-hr average). The general Ministry standard for  $H_2S$  is 20 ppb for a 1/2-hr average.

#### 4.0 Conclusions

Organic and chlorinated organic target compounds were not found in significant concentrations during any of the monitoring periods.

The monitoring crew noticed only one brief odour episode for total reduced sulphur, when a 1-minute average of 37 ppb was reached but the maximum 1/2-hr average concentration was low (7 ppb).

Phenolic resin odours were noticed only during the pre-screening sample period at fairly mild intensity levels. The pre-screen sample analysis showed nothing significant, however, either because of very low levels or because phenolic compounds are polar in character (hence odorous) and not usually detected by the analytical system used in the MAMU #1 or the lab at ARB (using a preconcentrator-gas chromatograph system).

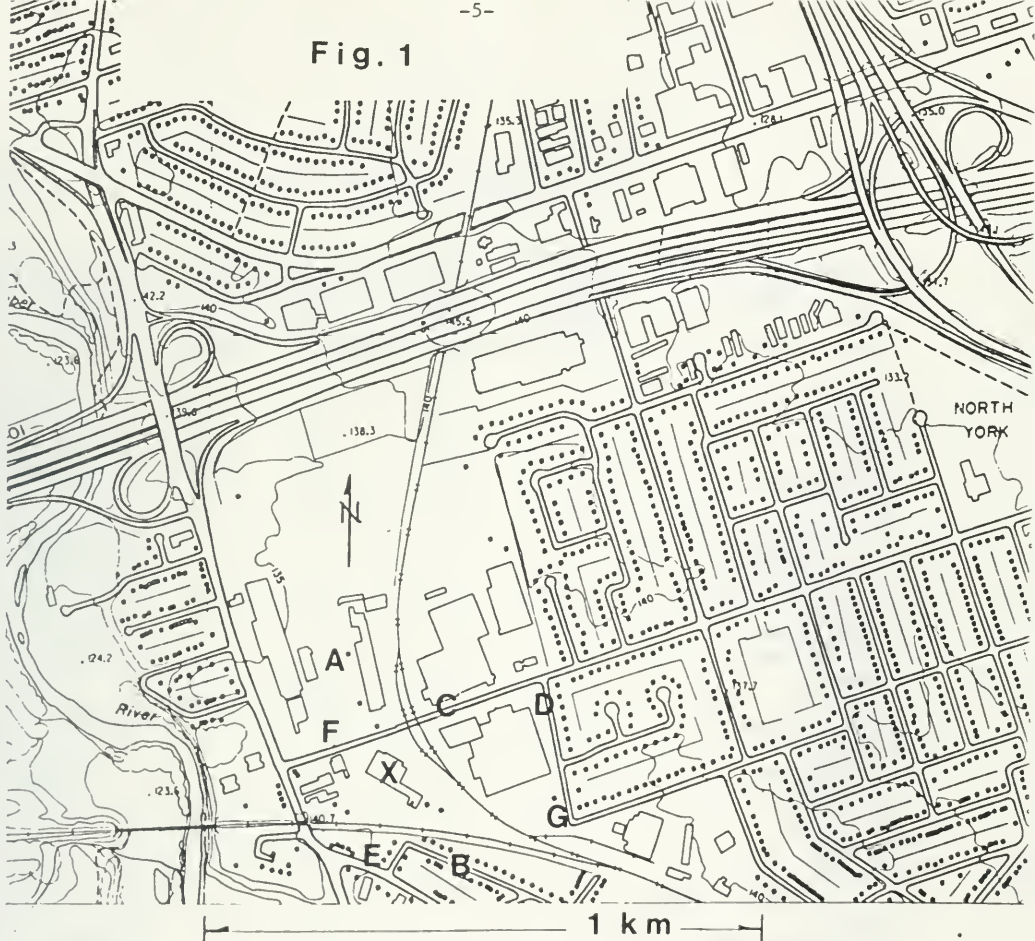


TABLE # 1  
Monitoring Locations and Periods

| Date       | Period # | Start Time | Duration (hrs) | Location                        | Map I.D. (Fig. 1) |
|------------|----------|------------|----------------|---------------------------------|-------------------|
| July 24/89 | A242     | 13:50      | 0.70           | East side of Knob Hill Farms    | A                 |
| July 24/89 | A243     | 14:42      | 1.23           | East side of Knob Hill Farms    | A                 |
| July 25/89 | A252     | 10:58      | 1.07           | Holley Ave (near #44)           | B                 |
| July 27/89 | A272     | 11:46      | 1.12           | Oak St.(30 m east of train line | C                 |
| July 27/89 | A273     | 13:13      | 2.08           | Yelland St near Oak St          | D                 |
| July 28/89 | A282     | 11:19      | 0.72           | Holley Ave (near #47)           | B                 |
| July 28/89 | A283     | 12:28      | 2.65           | Plaza at Parke St/Weston Rd     | E                 |
| July 31/89 | A312     | 11:12      | 2.05           | Knob Hill Farms parking lot     | F                 |
| July 31/89 | A313     | 13:36      | 1.22           | Yelland St and Queenslea Ave    | G                 |
| Aug. 3/89  | A033     | 10:55      | 4.05           | Yelland St and Queenslea Ave    | G                 |
| Aug. 4/89  | A042     | 10:40      | 1.00           | Parke St and Weston Rd          | E                 |

CGC

X

Table 2

Canadian Gypsum Company (1989)  
(ug/m<sup>3</sup>)

| Period #                            | A24JUL_2  | A24JUL_3  | A27JUL_1  | A27JUL_2  | for 30-min  |       |
|-------------------------------------|-----------|-----------|-----------|-----------|-------------|-------|
| Monitoring period                   | 1351-1421 | 1449-1519 | 1147-1217 | 1310-1340 | sample      |       |
| Date                                | JUL 24    | JUL 24    | JUL 27    | JUL 27    | (see notes) |       |
| Downwind / Upwind                   | DOWNWIND  | DOWNWIND  | DOWNWIND  | DOWNWIND  | MDL         | MDL   |
| 1 PROPANE                           | 26        | 17        | 11        | 10        | 0.4         | 2.2   |
| 2 CHLOROETHENE                      |           |           |           |           | 1.2         | 5.9   |
| 3 BUTANE                            | 362       | 139       | 53        | 33        | 2.4         | 12.2  |
| 4 PENTANE                           | 118       | 47        | 34        | 25        | 1.8         | 9.1   |
| 5 DICHLOROMETHANE                   | i         |           |           |           | 7.9         | 39.6  |
| 6 HEXANE                            | 35        | 16        | 18        | 10        | 1.1         | 5.6   |
| 7 TRICHLOROMETHANE                  |           |           |           |           | 27.7        | 138.4 |
| 8 1,2-DICHLOROETHANE                |           |           |           |           | 3.5         | 17.6  |
| 9 1,1,1-TRICHLOROETHANE             | T         | T         | 20        | 26        | 2.7         | 13.4  |
| 10 BENZENE                          | i         | 17        | i         | 18        | 1.5         | 7.6   |
| 11 TETRACHLOROMETHANE               | i         |           | i         |           | 5.0         | 25.0  |
| 12 TRICHLOROETHENE                  |           |           |           |           | 4.7         | 23.4  |
| 13 HEPTANE                          | T         | T         | T         | T         | 1.3         | 6.3   |
| 14 TOLUENE                          | 47        | 33        | 85        | 205       | 3.9         | 19.3  |
| 15 TETRACHLOROETHENE                |           |           |           |           | 6.5         | 32.5  |
| 16 OCTANE                           | T         | T         | T         | T         | 0.8         | 3.8   |
| 17 CHLOROBENZENE                    |           |           |           |           | 2.1         | 10.7  |
| 18 ETHYLBENZENE                     | T         | T         | T         | T         | 2.3         | 11.3  |
| 19 M,P-XYLENE                       | T         | T         | 31        | 25        | 4.1         | 20.7  |
| 20 STYRENE                          |           |           | T         | T         | 2.0         | 9.9   |
| 21 o-XYLENE                         | T         | T         | 11        |           | 1.8         | 9.0   |
| 22 1,1,2,2-TETRACHLOROETHANE        |           |           | T         |           | 11.5        | 57.3  |
| 23 NONANE                           |           | T         | T         | T         | 1.5         | 7.4   |
| 24 1,2,4-TRIMETHYLBENZENE           |           |           | i         | i         | 4.6         | 23.0  |
| 25 1,3-DICHLOROBENZENE              |           |           |           |           | 6.1         | 30.5  |
| 26 DECAE                            |           |           |           |           | 1.9         | 9.3   |
| 27 1,2-DICHLOROBENZENE              |           |           |           |           | 6.4         | 31.9  |
| 28 1,2-DIETHYLBENZENE               |           |           |           |           | 4.4         | 21.8  |
| 29 UNDECANE                         |           | T         | T         |           | 3.7         | 18.4  |
| 30 1,2,4-TRICHLOROBENZENE           |           |           |           |           | 10.3        | 51.3  |
| 31 NAPHTHALENE                      |           |           |           |           | 10.4        | 52.1  |
| 32 DODECANE                         |           | T         |           |           | 4.3         | 21.5  |
| 33 TRIDECANE                        |           |           | T         | T         | 2.1         | 10.6  |
| Total Organics (ug/m <sup>3</sup> ) | 708       | 334       | 390       | 422       |             |       |

MDL - minimum detectable level, as determined from seven replicate injections

MDL - minimum quantifiable level (5 x MDL), below which exact numbers are not quoted

T - result between MDL and MDL

i - interference present, compound may or may not be present - so exact result is not quoted

Table 2

Canadian Gypsum Company (1989)  
(ug/m<sup>3</sup>)

| Period #                            | A28JUL_1  | A28JUL_2  | A31JUL_1  | A31JUL_2  | Standard or    |    |
|-------------------------------------|-----------|-----------|-----------|-----------|----------------|----|
| Monitoring period                   | 1228-1258 | 1353-1423 | 1110-1140 | 1330-1400 | Guideline (**) |    |
| Date                                | JUL 28    | JUL 28    | JUL 31    | JUL 31    |                |    |
| Downwind / Upwind                   | DOWNWIND  | DOWNWIND  | DOWNWIND  | UPWIND    |                |    |
| 1 PROPANE                           | 6         | 8         | 13        | 26        |                |    |
| 2 CHLOROETHENE                      |           |           |           |           | 3              | IS |
| 3 BUTANE                            | 42        | 105       | 166       | 512       |                |    |
| 4 PENTANE                           | 27        | 32        | 72        | 148       |                |    |
| 5 DICHLOROMETHANE                   |           | i         |           |           | 5300           | TS |
| 6 HEXANE                            | 10        | 9         | 25        | 33        | 35000          | G  |
| 7 TRICHLOROMETHANE                  |           |           |           |           | 1500           | G  |
| 8 1,2-DICHLOROETHANE                |           |           |           |           |                |    |
| 9 1,1,1-TRICHLOROETHANE             |           | T         | T         |           | 350000         | S  |
| 10 BENZENE                          | 14        | 15        | 30        | 28        | under review   |    |
| 11 TETRACHLOROMETHANE               |           | i         |           |           | 1800           | G  |
| 12 TRICHLOROETHENE                  |           |           |           |           | 85000          | S  |
| 13 HEPTANE                          | T         | T         | T         | T         |                |    |
| 14 TOLUENE                          | 33        | 31        | 55        | 35        | 2000           | S  |
| 15 TETRACHLOROETHENE                |           |           |           |           | 10000          | G  |
| 16 OCTANE                           | T         | T         | T         | T         | 45400          | PG |
| 17 CHLOROBENZENE                    |           |           |           |           | 4200           | TS |
| 18 ETHYLBENZENE                     | T         | T         | T         | T         | 4000           | S  |
| 19 M,P-XYLENE                       | T         | T         | 30        | T         | 2300           | S  |
| 20 STYRENE                          | T         |           |           |           | 400            | S  |
| 21 o-XYLENE                         | T         | T         | 10        | T         | 2300           | S  |
| 22 1,1,2,2-TETRACHLOROETHANE        |           |           |           |           |                |    |
| 23 NONANE                           |           |           |           |           |                |    |
| 24 1,2,4-TRIMETHYLBENZENE           | i         | i         | i         | i         | 500            | G  |
| 25 1,3-DICHLOROBENZENE              |           |           |           |           |                |    |
| 26 DECAENE                          |           |           | T         |           |                |    |
| 27 1,2-DICHLOROBENZENE              |           |           |           |           | 37000          | TS |
| 28 1,2-DIETHYLBENZENE               |           |           |           |           |                |    |
| 29 UNDECANE                         |           |           |           |           |                |    |
| 30 1,2,4-TRICHLOROBENZENE           |           |           |           |           | 100            | G  |
| 31 NAPHTHALENE                      |           |           |           |           | 36             | PG |
| 32 DODECAENE                        |           |           |           |           |                |    |
| 33 TRIDECANE                        |           |           |           |           |                |    |
| Total Organics (ug/m <sup>3</sup> ) | 183       | 278       | 455       | 832       |                |    |

T - result between MDL and MOL

i - interference present, compound may or may not be present - so exact result is not quoted

\*\* S - standard

TS - tentative design standard

G - guideline

IS - interim standard

PG - provisional guideline

Table 2

Canadian Gypsum Company (1989)  
(ug/m<sup>3</sup>)

| Period #                            | A3AUG_1   | A3AUG_2   | A3AUG_3   | A4AUG_1   | A4AUG_2   |
|-------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Monitoring period                   | 1052-1122 | 1210-1240 | 1417-1447 | 0937-1007 | 1056-1126 |
| Date                                | AUG 3     | AUG 3     | AUG 3     | AUG 4     | AUG 4     |
| Downwind / Upwind                   | DOWNWIND  | DOWNWIND  | DOWNWIND  | DOWNWIND  | UPWIND    |
| 1 PROPANE                           | 12        | 10        | 6         | 14        | 15        |
| 2 CHLOROETHENE                      |           |           |           |           |           |
| 3 BUTANE                            | 185       | 291       | 68        | 226       | 356       |
| 4 PENTANE                           | 64        | 101       | 23        | 90        | 160       |
| 5 DICHLOROMETHANE                   |           |           |           |           |           |
| 6 HEXANE                            | 17        | 23        | T         | 25        | 45        |
| 7 TRICHLOROMETHANE                  |           |           |           |           |           |
| 8 1,2-DICHLOROETHANE                |           |           |           |           |           |
| 9 1,1,1-TRICHLOROETHANE             | T         | T         | T         | T         | T         |
| 10 BENZENE                          | 19        | i         | T         | 26        | 35        |
| 11 TETRACHLOROMETHANE               |           | i         |           |           |           |
| 12 TRICHLOROETHENE                  |           |           |           |           |           |
| 13 HEPTANE                          | T         | T         |           |           | T         |
| 14 TOLUENE                          | 36        | 25        | T         | 51        | 61        |
| 15 TETRACHLOROETHENE                |           |           |           |           |           |
| 16 OCTANE                           | T         |           |           |           | T         |
| 17 CHLOROBENZENE                    |           |           |           |           |           |
| 18 ETHYLBENZENE                     | T         | T         |           | T         | T         |
| 19 M,P-XYLENE                       | 21        | T         | T         | 30        | 24        |
| 20 STYRENE                          |           |           |           | T         |           |
| 21 o-XYLENE                         | T         | T         | T         | 9         | T         |
| 22 1,1,2,2-TETRACHLOROETHANE        |           |           |           |           |           |
| 23 NONANE                           |           |           |           |           |           |
| 24 1,2,4-TRIMETHYLBENZENE           | i         | i         |           | i         | i         |
| 25 1,3-DICHLOROBENZENE              |           |           |           |           |           |
| 26 DECANE                           |           |           |           | T         | T         |
| 27 1,2-DICHLOROBENZENE              |           |           |           |           |           |
| 28 1,2-DIETHYLBENZENE               |           |           |           |           |           |
| 29 UNDECANE                         |           |           |           |           |           |
| 30 1,2,4-TRICHLOROBENZENE           |           |           |           |           |           |
| 31 NAPHTHALENE                      |           |           |           |           |           |
| 32 DODECANE                         | T         |           |           |           |           |
| 33 TRIDECANE                        | T         |           |           |           |           |
| Total Organics (ug/m <sup>3</sup> ) | 411       | 526       | 140       | 522       | 742       |

MDL - minimum detectable level, as determined from seven replicate injections

MLQ - minimum quantifiable level (5 x MDL), below which exact numbers are not quoted

T - result between MDL and MLQ

i - interference present, compound may or may not be present - so exact result is not quoted

Table 3

Canadian Gypsum Company (1989)

(all cartridges in this table were analyzed at ARB)

| Location:                    | Blank | Dak St.   | Yelland/Queenslea | Yelland/Queenslea |
|------------------------------|-------|-----------|-------------------|-------------------|
| Date sampled:                |       | 07/27/89  | 08/02/89          | 08/03/89          |
| Time sampled:                |       | 1150-1220 | 0950-1020         | 1210-1240         |
| comments (if any)            |       | some odor |                   |                   |
|                              |       | dw        | dw                | dw                |
| 1 PROPANE                    |       | T         | 18                | T                 |
| 2 CHLOROETHENE               |       |           |                   |                   |
| 3 BUTANE                     |       | 32        | 45                | 117               |
| 4 PENTANE                    |       | 21        | 36                | 45                |
| 5 DICHLOROMETHANE            |       |           | T                 |                   |
| 6 HEXANE                     |       | T         | 22                | T                 |
| 7 TRICHLOROMETHANE           |       |           | 37                |                   |
| 8 1,2-DICHLOROETHANE         |       |           |                   |                   |
| 9 1,1,1-TRICHLOROETHANE      |       | 15        | 19                |                   |
| 10 BENZENE                   | 2     | 18        | i                 | 8                 |
| 11 TETRACHLOROMETHANE        |       |           | i                 |                   |
| 12 TRICHLOROETHENE           |       |           |                   |                   |
| 13 HEPTANE                   |       |           | T                 |                   |
| 14 TOLUENE                   |       | 133       | 82                | 12                |
| 15 OCTANE                    |       |           | T                 |                   |
| 16 TETRACHLOROETHENE         |       |           | 17                |                   |
| 17 CHLOROBENZENE             | 1     | T         | T                 |                   |
| 18 ETHYLBENZENE              |       | T         | 14                | T                 |
| 19 m,p-XYLENE                |       | T         | 50                | T                 |
| 20 STYRENE                   |       |           | T                 |                   |
| 21 1,1,2,2-TETRACHLOROETHANE |       |           |                   |                   |
| 22 o-XYLENE                  |       | T         | 16                | T                 |
| 23 NONANE                    |       |           | T                 |                   |
| 24 1,2,4-TRIMETHYLBENZENE    |       |           | 20                |                   |
| 25 1,3-DICHLOROBENZENE       |       |           |                   |                   |
| 26 DECAENE                   |       |           | T                 |                   |
| 27 1,2-DICHLOROBENZENE       |       |           |                   |                   |
| 28 1,2-DIETHYLBENZENE        |       |           |                   |                   |
| 29 UNDECANE                  |       |           | T                 |                   |
| 30 1,2,4-TRICHLOROBENZENE    |       |           |                   |                   |
| 31 NAPHTHALENE               |       |           |                   |                   |
| 32 DODECANE                  |       |           | T                 |                   |
| 33 TRIDECANE                 |       |           | 23                |                   |
| Total Organics (ug/m3)       | 3     | 220       | 358               | 182               |









